EVALUATION STRESS, NANOCRYSTALLINITY, PURITY CRYSTALLINITY IN DIAMOND FILMS DEPOSITED ON Ti6Al2Sn4Zr2Mo ALLOY USING THE ASSISTED TECHNIQUE OF MICROWAVE PLASMA

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Abstract

This research looks forward to the development of new materials that could ensure the protection of titanium alloys in relation the weariness, thus increasing its usable lifetime. Deposition of CVD diamond thin films were studied on titanium alloys, aiming at further objectives such as in mechanics industry and biomedical implants. Titanium alloys are biocompatible, though not being hemocompatible, deposition of a material with exceptional organic and mechanical properties as is diamond, brings the best solution to that challenge. Another important factor is the combination between the high traction force (or compression) and the low density of the titanium alloys (between 4,37 g/cm^3 and 4,85 g/cm^3), resulting in an extremely high ratio between force and density for the alloys. This relation is practically higher than all other metals, thus allowing to be applied in many applications. Several depositions were made and the characterization of the CVD diamond films on Ti6Al2Sn4Zr2Mo alloy at 600 C. Both stress and qualitative adherence were evaluated. Films were deposited using the assisted technique of microwave plasma. Various techniques were tested in the preparation of the substrate surface before depositioning the films, promoting its modification. Data for analysis are being obtained using Raman Scattering Spectroscopy for stress and purity cristallinity calculus. Based in the singularly properties of the CVD diamond and its potential in the condition of a new material, many basic studies and consequent applications in areas such the mechanical, electronics, optical and bioimplants. The qualitative adherence and the stress calculus that the film is submitted, both are related with the parameters of growing, substrate preparation, type of substrate, film quality, roughness and grain size.

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